AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A microfluidic device comprising a set of one or more covered non-electrophoresis microchannel structures manufactured in the surface of a planar substrate, wherein non-specific adsorption and hydrophilicity are optimised by a coat exposing a non-ionic hydrophilic polymer on a part of the surface of at least one of the microchannel structures.

2. (Currently Amended) The microfluidic device of claim 1, wherein the surface carrying the coat is made of organic ~~or inorganic~~ material.

3. (Previously Presented) The microfluidic device of claim 1, wherein the surface of the planar substrate is made of plastics.

4. (Previously Presented) The microfluidic device of claim 1, wherein the non-ionic hydrophilic polymer is attached covalently directly to the surface or to a polymer skeleton that is attached to the surface.

5. (Previously Presented) The microfluidic device of claim 1, wherein the microfluidic device comprises more than five covered microchannel structures.

6. (Previously Presented) The microfluidic device of claim 1, wherein each microchannel structures comprises a functional part selected from the group consisting of application cavity, conduit for liquid transport, reaction cavity, volume defining unit, mixing cavity, chamber for separating components of the sample, detection cavity.

7. (Currently Amended) The microfluidic device of claim 6, wherein the non-ionic hydrophilic polymer is present on the surface of at least one of the functional parts in which ~~and gives the surface a sufficient hydrophilicity for~~ aqueous liquid is capable of entering such functional part by self-suction when the liquid has passed the entrance of the functional part. ~~to enter the part once having passed the entrance of the part.~~

8. (Previously Presented) The microfluidic device of claim 1, wherein each microchannel structure comprises a microcavity having a volume ≤ 1 μl.

9. (Previously Presented) The microfludic device of claim 1, wherein mass transport of solutes and/or particles between different function parts of each microchannel structure uses a liquid flow caused by non-electrokinetic forces.

10. (Previously Presented) The microfluidic device of claim 1, wherein the device is a round disc.

11. (Currently Amended) The microfluidic device of claim 1, wherein the non-ionic hydrophilic polymer ~~is selected from the group of polymers consisting~~ contains hydroxy groups, ethylene oxy groups, ~~and~~or amide groups.

12. (Previously Presented) The microfluidic device of claim 11, wherein the non-ionic hydrophilic polymer is a polyhydroxy polymer.

13. (Currently Amended) The microfluidic device of claim 1, wherein the non-ionic hydrophilic polymer is selected from the group ~~of~~ consisting of polysaccharides, water-soluble derivatives of polysaccharides, polyvinyl alcohols, and poly(hydroxy alkyl vinylether) polymers.

14. (Previously Presented) The microfluidic device of claim 1, wherein the non-ionic hydrophilic polymer is a reaction product between ethylene oxide and a dihydroxy or a polyhydroxy compound.

15. (Previously Presented) The microfluidic device of claim 11, wherein the non-ionic hydrophilic polymer comprises one or more blocks of polyoxyethylene chains.

16. (Previously Presented) The microfluidic device of claim 15, wherein the non-ionic hydrophilic polymer is polyethylene glycol.

17. (Previously Presented) The microfluidic device of claim 11, wherein the non-ionic hydrophilic polymer is polyethylene glycol which has a methoxy group at the end which does not bind to the part surface.

18. (Previously Presented) The microfluidic device of claim 11, wherein the non-ionic hydrophilic polymer comprises a plurality of amide groups.

19. (Previously Presented) The microfluidic device of claim 1, wherein the non-ionic hydrophilic polymer a polymerisate/copolymerisate with monomers selected from the group consisting of acrylamide, methacrylamide and vinylpyrrolidone.

20. (Previously Presented) The microfluidic device of claim 1, wherein the non-ionic hydrophilic polymer is attached to a polymer skeleton that is attached to the part surface.

21. (Previously Presented) The microfluidic device of claim 20 wherein the attachment between the non-ionic hydrophilic polymer and the polymer skeleton is covalent.

22. (Currently Amended) The microfluidic device of claim 21, wherein the polymer skeleton is an ~~inorganic or an~~ organic polymer.

23. (Previously Presented) The microfluidic device of claim 20, wherein the skeleton is selected from the group consisting of cationic, anionic, and neutral polymers.

24. (Previously Presented) The microfluidic device of claim 20, wherein the skeleton is a polyamine.

25. (Previously Presented) The microfluidic device of claim 20, wherein the skeleton is a polyethylene imine.

26. (Previously Presented) The microfluidic device of claim 20, wherein the skeleton has a molecular weight 10,000-3,000,000 dalton.

27. (Previously Presented) The microfluidic device of claim 1, wherein the surface of the planar substrate without the coat is made of plastics and the part surface without coat is hydrophilized by plasma treatment or by an oxidation agent in order to introduce functional groups that allow for a subsequent attachment of the coat onto the part surface.

28. (Previously Presented) The microfluidic device of claim 1, wherein the surface of the planar substrate is made of plastics and that the plastics has a non-significant

fluorescence for excitation wavelengths in the interval 200-800 nm and emission wavelengths in the interval 400-900 nm.

29. (Previously Presented) The microfluidic device of claim 1, wherein the device is in a dry state that is capable of being rehydrated.

30. (Currently Amended) A method of performing an analytical assay using the microfluidic device of claim 1 comprising ~~one or more of~~ the steps of:

a. preparing a sample;

b. running the assay reaction; and

c. detecting the result of the assay reaction, wherein the result is a measure of activity of the sample.

31. (Currently Amended) A microfluidic device comprising a set of one or more covered non-electrophoresis microchannel structures manufactured in the surface of a planar substrate, wherein a part surface of at least one of the microchannel structures comprises a coat exposing a non-ionic hydrophilic polymer and that the surface of the planar substrate is made of plastics that comprises a non-significant fluorescence for excitation wavelengths in the interval 200-800 nm and emission wavelengths in the interval 400-900 nm.

32. (Previously Presented) The microfluidic device of claim 31, wherein the plastics is based on a polymer of aliphatic monomers containing polymerizable carbon-carbon double bonds.

33. (Currently Amended) The microfluidic device of claim ~~33~~32, wherein the monomer is selected from the group consisting of a cycloalkaene, ~~norbornene or substituted norbornene,~~ ethylene and propylene.

34. (Previously Presented) The microfluidic device of claim 3, wherein the plastics is based on a polymer of aliphatic monomers containing polymerizable carbon-carbon double bonds.

35. (Currently Amended) The microfluidic device of claim 34, wherein the monomer is selected from the group consisting of a cycloalk~~a~~ene, ~~norbornene or substituted norbornene,~~ ethylene and propylene.

36. (Previously Presented) The microfluidic device of claim 1, wherein mass transport of solutes and/or particles between different functional parts of each microchannel structure uses a liquid flow caused by electroendoosmosis.

37. (Canceled)

38. (Currently Amended) A microfluidic device comprising a set of one or more covered non-electrophoresis microchannel structures manufactured in the surface of a planar substrate, wherein a part surface of at least one of the microchannel structures comprises a coat exposing a non-ionic hydrophilic polymer and that the surface of the planar substrate is made of plastics that is based on a polymer of aliphatic monomers containing polymerizable carbon-carbon double bonds.

39. (Currently Amended) The microfluidic device of claim 38 wherein the monomer is selected from the group consisting of cycloalk~~a~~enes, ~~norbornene or substituted norbornenes,~~ ethylene and propylene.

40. (Previously Presented) The microfluidic device of claim 38 wherein the non-ionic hydrophilic polymer optimizes non-specific adsorption and hydrophilicity in relation to each other.

41. (Previously Presented) The microfluidic device of claim 38 wherein a microchannel structure comprises a functional part selected from the group consisting of application cavity, conduit for liquid transport, reaction cavity, volume defining unit, mixing cavity, cavity for separating components of the sample, detection cavity.

42. (New) The microfluidic device of claim 1, wherein the surface carrying the coat is made of inorganic material.

43. (New) The microfluidic device of claim 21, wherein the polymer skeleton is an inorganic polymer.

44. (New) The microfluidic device of claim 33, wherein the cycloalkene is a norbornene or substituted norbornene.

45. (New) The microfluidic device of claim 35, wherein the cycloalkene is norbornene or substituted norbornene.

46. (New) The microfluidic device of claim 39 wherein the cylcoalkene is a norbornene or substituted norbornenes.

47. (New) The microfluidic device of claim 1, wherein the microchannel structures are intended for transporting solutes and/or particles by a liquid flow from one functional part to another within the same microchannel structure.

48. (New) The microfluidic device of claim 47, wherein the part of the surface that is optisimed is in at least one of the functional parts of each microchannel structure.

49. (New) The microfluidic device of claim 48, wherein the microchannel structures comprise one or more functional parts selected from the group consisting of reaction chamber and/or cavity, volume-defining unit, mixing chamber and/or cavity, and detection chamber and/or cavity.

50. (New) The microfluidic device of claim 49, wherein the microchannel structures are in a dry state.

51. (New) The microfluidic device of claim 48, wherein liquid is capable of entering such a functional part by self-suction when the liquid has passed the entrance of the functional part.

52. (New) The microfluidic device of claim 49, wherein at least one functional part comprises a volume-defining unit.

53. (New) The microfluidic device of claim 52, wherein the at least one functional part comprises a conduit for liquid transport, a reaction chamber and/or cavity, a

mixing chamber and/or cavity, a chamber for separating components of the sample, a detection chamber and/or cavity, and a waste conduit and/or cavity.